Probe measurements on the Tokamak GOLEM

Vojtěch Svoboda[1], Jan Stockel[2] ,Miglena Dimitrova[2], Richard Duban[1],Martin Zacpal[1],Jan Horacek[2]

[1]*Faculty on Nuclear Sciences and Physical Engineering, Czech Technical University in Prague, Czech Republic, svoboda@fjfi.cvut.cz*

[2]*Institute of Plasma Physics, Czech Academy of Sciences, Prague, Czech Republic, stockel@ipp.cas.cz*

The GOLEM tokamak, which has been operated for more than 40 years as a scientific facility, became recently an educational device for domestic as well as for foreign students, via remote participation/handling. The reinstalled tokamak (R = 0.4 m, a = 0.085 m), operates currently at modest range of parameters: $B_t < 0.6$ T, $I_p < 8$ kA, discharge duration < 20 ms and with a limited set of diagnostics. A unique feature of this experimental arrangement is a possibility of a complete remote handling operation through the internet access. [1]. Consequently, all data in graphical/raw form are accessible via the special discharge web page. More than 1000 discharges were performed remotely across the borders of the Czech Republic being on duty as a remote laboratory practice or a tokamak performance presentation for foreign students in various plasma schools, workshops, lectures and training courses.

This contribution presents experimental results of measurements with several electric probes performed under different discharge conditions:

1) Measurements on the radial profiles of plasma parameters with the linear array of probes (the rake probe). Thanks to unique reproducibility of the GOLEM discharges, the IV characteristics are measured by changing the probe voltage on a shot-to shot basis. Consequently, the temporal resolution about 10 μs is achieved. Measurements are performed during a tokamak discharge, as well as during the pre-ionization phase of a discharge.
2) Poloidal asymmetry of edge plasma flow velocity is one of the current hot topics of high-temperature plasma physics. Recently, the tokamak GOLEM have been equipped with the ring of 16 Mach probes surrounding poloidally the plasma. The Mach probe will be exploited for measurements of parallel edge plasma flows along the magnetic field lines with unique spatial resolution.

[1] V. Svoboda et. al. Multimode Remote Participation on the GOLEM Tokamak. *Fusion Engineering and Design*, 86(6-8):1310–1314, 2011.